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A Comparison of Interaction Patterns of Effective and Less Effective Coaches

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A COMPARISON OF INTERACTION PATTERNS OF EFFECTIVE AND LESS EFFECTIVE COACHES

by

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An Abstract

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ABSTRACT

This study compared the interaction patterns of effective and less effective coaches during actual practice sessions. Subjects for this study were 30 secondary school coaches in the central New Hampshire, central New York, and northern New York areas. On 2 predetermined days subjects were taped during a random 30-minute segment of their practice session. The tapes were then viewed by a panel of four experienced teachers who scored each coach on the Coaches' Performance Criteria Questionnaire. Subjects were divided into two groups of effective and less effective coaches by the median of the average total scores of all judges. The videotapes were then independently coded using CAFIAS. Behaviors were recorded in sequence on tally sheets before being placed on computer cards. Computer analysis resulted in a print-out that tabulated ratios and percentages for the eight variables determined by CAFIAS. Variable mean scores for each coded coaching session were used to represent each coach. Groups were represented by the variable means of the coaches within each group. Multivariate analysis of variance was used to determine differences between the two groups of coaches. The null hypothesis that there will be no significant differences between effective and less effective coaches was rejected at the .05 level of significance. Univariate analyses of variance determined five out of eight CAFIAS variables were

independently significant. The variables were teacher use of acceptance and praise, verbal; teacher use of acceptance and praise, nonverbal; pupil verbal initiation, teacher suggested; pupil nonverbal initiation, teacher suggested; and pupil nonverbal initiation, student suggested. Discriminant function analysis revealed in linear functions that teacher use of acceptance and praise, verbal was the greatest contributor to between group differences. This variable favored the effective coaches. It can be concluded that there are differences in behaviors of effective and less effective coaches. Effective coaches display more indirect teaching behaviors than do less effective coaches.

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A Research Project Presented to the Faculty
of the School of Health, Physical
Education and Recreation
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Requirements for the Degree
Master of Science

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by
Diane E. Avery
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Ithaca College
School of Health, Physical Education and Recreation
Ithaca, New York

CERTIFICATE OF APPROVAL

MASTER OF SCIENCE RESEARCH PROJECT

This is to certify that the Research Project of

Diane E. Avery

submitted in partial fulfillment of the requirements for the degree of Master of Science in the School of Health, Physical Education, and Recreation at Ithaca College has been approved.

Research Project Advisor:

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Chapter 1

INTRODUCTION

Sports can influence the life, the development, the philosophy, personality, and character of individual participants (Maetozo, 1971). The theory that athletic participation can have a considerably positive influence on the player with regard to responsibility, fair play, cooperation, concern for others, leadership, respect for authority, good citizenship, loyalty and tolerance is widely accepted (Tutko & Richards, 1971). Desirable outcomes, however, depend on competent leadership (NAGWS, 1976). The most dominant controlling factor influencing the participant is the coach (Maetozo, 1971).

The coach is first and foremost a teacher (Sabock, 1973), planning learning situations that will be conducive to the acquisition of various knowledges, skills and attitudes of players (Moore, 1970). Coaching is perhaps the most challenging type of teaching (Gaylord, 1967) where situations of stress continually test a person's character (Tutko & Richards, 1971).

Virtually all teaching acts are conceived to produce learning (Vannier & Fait, 1975), but the wise person knows that while almost anything may work, success is not always justification for use (Oberteuffer & Ulrich, 1962). Traditionally the effectiveness of a coach has been based on win-loss records, on end results not upon means of achieving

this result (Struck, 1956). Yet, "most of the values in sports come from the methods, the means, the techniques, the ideas, and the manner in which victories are gained" (Gaylord, 1967, p. 13). Smoll, Smith, and Curtis (1977) found the following:

> Coaches for whom players enjoyed playing most and who were most successful in promoting feelings of self-worth, actually had won-lost records that were about the same as coaches who were less liked and less effective in fostering feelings of self-worth. (p. 11)

Teaching or coaching effectiveness cannot be judged by win-loss records which are dependent upon other factors such as injury, parity of budgets, scheduling, practice time, and athletic ability (Governali, 1974; Macholtz, 1978). Learning is an active process (Lawther, 1951). It involves interaction between the learner and the environment and its effectiveness relates to the "frequency, variety, and intensity of interaction" (Leonard, 1968, p. 19).

With the awesome responsibilities that coaches possess in the formation of numerous personalities, attitudes, and self-images, some measure of describing the discrepancies between the actual interaction patterns of effective and less effective coaches is long overdue (Wilson, 1977). If teachers or coaches wish to repeat their successes and avoid their failures, they must know that they do (Mosston, 1966).

Early attempts to describe teaching were characterized by subjective rating and evaluation forms which were wrought with bias. Their global descriptions of the teaching act gave teachers limited information about the productivity or advisability of specific techniques or teaching acts. Anderson was one of the first to look at teaching systematically in the late 1930's (Locke, 1977). Routine systematic investigation of teaching in physical education began 30 years later. Interaction analysis systems, categorically describing teaching acts and putting them in a sequential order, were used to supply teachers with reliable information about their own teaching behavior and to investigate the relationship between classroom interaction and teaching acts. Interaction analysis systems attempted to explain consistent relationships that existed between patterns of classroom interaction and pupil achievement (Amidon & Flanders, 1971).

Flanders' Interaction Analysis System (FIAS), used extensively in classroom observations (Amidon & Flanders, 1971), failed to supply feedback on nonverbal communication which was prominent in the formation of attitudes (Galloway, 1968) and abundant in physical education settings. Consequently, Cheffers developed nonverbal categories to supplement FIAS (Cheffers, Amidon, & Rodgers, 1974). Cheffers' Adaptation of Flanders' Interaction Analysis System (CAFIAS) has subsequently been used as a reliable tool in

describing physical education teaching behaviors in numerous studies (Mancini, 1974; Martinek, 1976; Rochester, 1976; Vogel, 1976).

While interaction analysis has been used in many physical education studies, its use in describing coaching sessions is limited. Kasson (1974) used the Mancuso Adaption for Verbal and Nonverbal Observation System in reporting no differences in direct and indirect teaching and coaching patterns of three male coaches. Agnew (1977) used CAFIAS to report three significant differences between teaching and coaching behaviors of 20 female secondary physical education teachers and coaches.

Besides describing teaching and coaching behaviors there is a recognized need to develop models that specify teaching and coaching practices and cite explicit correlated outcomes (Brophy, 1976; Coates & Thoresen, 1976; Gage, 1968; Locke, 1977; Medley & Mitzel, 1959). The most comprehensive list of teacher behaviors that had a direct and significant effect on student achievement was gathered and published by Rosenshine and Furst in 1971 from a comprehensive review of literature on correlation studies in which student achievement was a criterion measure. Questionnaires using Rosenshine and Furst's original list of 11 variables have been used by Keilty (1975) and Rochester (1976) to distinguish between effective and less effective teacher variables.

Questionnaires, rating forms, and interaction analysis systems have shown information transferal (teaching) is the predominant behavior of coaches (Clark, 1974; Danielson, Zelhart, & Drake, 1975; Tharp & Gallimore, 1976). The present study used Rosenshine and Furst's variables to separate effective from less-effective coaches and then used CAFIAS to describe the interaction patterns of both groups. If good coaching can be adequately and systematically described, it will cease to be upheld as a pure art. It can then be copied, practiced, and taught.

Scope of Problem

This study was initiated to compare the coaching behaviors of 15 effective and 15 less effective secondary school coaches. Subjects were selected from the central New Hampshire, central New York, and northern New York areas. Each coach was visited twice during the 1977-1978 winter sports season. Thirty-minute videotaped practice segments of each visit were coded using Cheffers' Adaptation of Flanders' Interaction Analysis System and the raw data were placed on computer cards. Mean scores were used to represent behaviors for the two practice sessions.

A panel of four judges viewed each taped session and scored coaches on the Coaches' Performance Criteria Questionnaire. The median of the total scores of all four judges on all nine variables was used to separate coaches

into two groups of effective and less effective coaches. Computer analysis compared percentage behaviors between the two groups.

Statement of Problem

This investigation was undertaken to compare the interaction patterns of effective and less effective coaches.

Hypothesis

There will be no significant differences between interaction patterns of effective and less effective coaches.

Assumptions of Study

The following assumptions were established in regard to this study:

1. The varying skill level, activity, or sex of the athletic teams would not affect the interaction patterns of the coach and players.

2. The subjects selected were representative of the population of secondary school coaches.

3. The coding of two 30-minute practice session segments using CAFIAS would be appropriate to establish a pattern of coaching behavior for each individual.

4. The use of a reliable coder was adequate to obtain a factual representation of the situation.

Definition of Terms

The following terms were operationally defined for the purpose of this investigation:

1. Coaches' Performance Criteria Questionnaire (CPCQ) is nine questions based on the teaching variables identified by Rosenshine and Furst (1973) that correlate with student achievement.

2. Effective coaches are coaches that have total CPCQ scores above the median of the population studied.

3. Less effective coaches are coaches that have total CPCQ scores below the median of the population studied.

4. Cheffers' Adaptation of Flanders' Interaction Analysis System (CAFIAS) is an interaction analysis system specifically designed for use in physical activity settings which expanded Flanders' Interaction Analysis System to objectively describe both verbal and nonverbal teacher-pupil interaction, class structure, and a variety of classroom teaching agents (Cheffers et al., 1974).

5. Flanders Interaction Analysis System (FIAS) is an objective observation system designed to measure 10 categories of verbal teacher-student interaction (Amidon & Flanders, 1971).

6. Verbal behavior is audible spoken talk or interaction.

7. Nonverbal behavior is observable conduct or interaction which is not audible.

8. Coaches are leaders of voluntary instructional programs held after school hours where individuals compete for the privilege of participation.

9. Secondary school level is grades nine through twelve.

10. Direct teaching behavior is teacher behavior which limits the freedom of students.

11. Indirect teaching behavior is teacher behavior which encourages freedom of action of students.

Delimitations of Study

The following were delimitations of this study:

1. Only secondary school coaches of team sports were used during the 1977-1978 winter sports season.

2. Each subject was observed only twice during practice sessions.

3. This study used only one questionnaire, the CPCQ, to differentiate between effective and less effective coaches.

4. This study used only one interaction analysis system, CAFIAS, to describe coaching behaviors.

Limitations of Study

The following were the limitations of this study:

1. The findings may only be valid for secondary school coaches of team sports.

2. The findings may only be valid when the CPCQ is used to classify coaches.

3. The findings may only be valid when CAFIAS is used.

Chapter 2

REVIEW OF RELATED LITERATURE

The review of related literature relevant to this study will focus on the following areas: (a) analysis of teaching, (b) interaction analysis in education, (c) descriptive-analytical techniques in physical education, (d) analysis of coaching, and (e) teaching effectiveness measures.

Analysis of Teaching

A coach has been defined as first and foremost a teacher (Sabock, 1973). Although working with an elite group of athletes, the coach's primary responsibility is to plan learning situations that will be conducive to the acquisition of various knowledges, skills, and attitudes of players (Moore, 1970).

Teaching has been defined as behavior undertaken with the purpose of affecting a change in another's behavior (McNeil & Popham, 1973). Children have been depicted as pliable individuals that can be molded to conform to an established pattern. Teachers thus bear a substantial burden of accountability in the methods and manner in which they go about affecting change in other human beings.

Methods and means must be established to check teaching effectiveness from an administrative point of view and from an individual teacher's point of view; a teacher needs feedback to determine if one's behavior is "on target" with

one's intent (Goldberger, 1974). Coaches have traditionally been evaluated on win-loss percentages, but this form of evaluation fails to consider extenuating circumstances or methods of achieving end results.

Early research in teacher evaluation used student achievement scores, student ratings, peer rating forms, and subjective observations to describe the teaching act. Although each was an honest attempt to differentiate among teachers, each was biased and wrought with problems. Student achievement scores have questionable validity (Ornstein, 1976), sometimes cause student hostility (Pratt, 1977), and ignore conditions beyond the teacher's control (Gage, 1972). Rating forms are distorted by "halo" effects, errors of leniency, errors of central tendency, and errors of rater's bias (Ornstein, 1976). Observations are limited by the observer's reliability, the teacher's tendency to put on an act, the Hawthorne effect, and the observer's own values and interpretation of what constitutes a good teaacher (Ornstein, 1976).

Various theories on the critical element of the teaching process led to a variety of instruments designed to isolate various components of teaching. In 1939 Anderson, feeling the affective domain was critical to the teaching-learning process, developed an observation system to distinguish between teaching acts that expanded students' behavior as

opposed to teaching acts that limited students' freedom. He concluded that students under indirect leadership were more self-directed and cooperative than those under direct leadership (Anderson, 1939).

Lippitt and White in 1943 confirmed Anderson's research by finding significant behavioral changes in 10-year-old boys subjected to three instructional atmospheres (democratic, authoritarian, and laissez-faire). In 1949 Withall, using a seven-category system to describe the social-emotional climate of the classroom, identified teacher-centered and learner-centered behaviors comparable with those found by Anderson (1939).

Alternative observation systems focused on various critical behaviors. The Coping Analysis Schedule for Educational Settings (CASES) was developed by Spaulding (1967) to isolate overt behavior of children. Bookhout (1965) used the Observation Schedule and Record to identify two patterns of behavior, integrative and restraining, that related to supportive and defensive climates respectively. In 1970 Simon and Boyer identified 73 observational systems used in teaching research including the Fuller Affective Interaction Record which described interpersonal and affective teacher and pupil behavior in addition to content and procedure categories. Simon and Boyer (1970) found a correlation between positive emotional environments and

teachers who accepted ideas, feelings, and the efforts of their students.

Interaction Analysis in Education

In the 1950's an era of scientific analysis of the teaching-learning situation began. Emphasis on the affective domain gave way to an examination of interpersonal relationships within the classroom. In 1950 Bales investigated the verbal interaction of small problem solving groups and first introduced the term "interaction process analysis." Since that time interaction analysis systems have appeared at a phenomonal rate. One hundred and twenty observation instruments have been identified by Rosenshine and Furst (1973).

Interaction analysis (IA) systems are methods of observing, categorizing, recording, and analyzing the classroom behaviors of teachers and students (Rankin, 1978). IA systems strive to provide accurate records of significant real world events. They provide (a) a standardized set of procedures for observing teaching events, (b) a coding and recording instrument that specifies carefully defined categories of observable behaviors, and (c) a procedure for presenting the data in some meaningful form (Fishman & Anderson, 1971). The ability to describe teaching as a series of acts through time is expected to lead to the establishment of models of behavior which are appropriate to different kinds of teaching situations (Flanders, 1963).

Hence, a teacher will be able to understand teacher-pupil interaction and, in particular, "to specify conditions in which learning is maximized" (Flanders, 1967, p. 103). To give a teacher something definite, both in the form of a diagnosis and subsequent prognosis, to help in improving one's teaching is to move from the hopelessly vague art of teaching to a scientific study of teaching (Campbell & Barnes, 1969).

In 1960, Flanders published the most popular interaction system to date. By 1976 it was estimated that approximately 10,000 teachers and 9,000 pupils had been observed using this system within educational research (Shiffman, 1976). Flanders' system consisted of seven teacher talk categories, two student talk categories, and one category for intervals of silence or confusion. Interaction was recorded once every three seconds, and the tallies were placed on a 10 x 10 matrix for interpretation. Interaction was classified as being direct or indirect; limiting or increasing student freedom (Cheffers el al., 1974).

In their respective studies, Flanders (1960) and Bellack (1967) both concluded that the teacher dominated the classroom interaction with a three-to-one ratio of teacher-student verbal activity. Other researchers, led by Galloway (1968), felt nonverbal interaction was also crucial to classroom interaction and especially prominent in the

formation of attitudes. Galloway modified FIAS to include nonverbal interactions in addition to verbal categories.

Amidon and Hunter (1966) developed the Verbal Interaction Category System which differentiated student and teacher verbal communication as being either initiatory or responsive. Based on FIAS this system added two categories and stressed behavioral patterns.

Many of these early systems were used to equate student growth with direct or indirect teacher behaviors. Direct teaching behaviors were those limiting student freedom including criticism, lecturing, and directions. Indirect teaching behaviors were praise, acceptance and use of ideas, and questioning behaviors. Amidon and Flanders (1971) and Soar (1967) both reported students learn more and have more positive attitudes when taught indirectly. Despite these findings, Giammatteo (1963) observed that the verbal interaction patterns of elementary school teachers were found to be more direct than indirect. In 1967 Soar concluded that the more abstract the learning task, the greater the positive effect was of indirect teaching. Meanwhile, Hughes (1967) found that open classroom environments supplemented by indirect teaching resulted in increased student participation. Cogan (1958) found student attitudes toward doing additional and extra school work improved when instructed by what they perceived as an integrative teacher.

Descriptive-Analytical Techniques in Physical Education

The teaching that occurs in the physical education domain has some unique qualities often differing from the classroom situation. Physical education can be characterized as (a) being dominated at times by nonverbal productive activity (game playing and drills), (b) possessing unusual amounts of augmented feedback, and (c) having unique operational procedures (Locke, 1977).

Early research using conventional interaction analysis systems in physical education is limited. Bookhout (1965) used a modified version of the Observation Schedule and Record to describe the relationship between social-emotional climate and patterns of teacher behavior in 36 physical education classes. FIAS was used by Bahneman (1971) and Kurth (1969), but both noted limitations in FIAS when it was used to describe physical education environments.

In 1969 Barrett developed a system to describe teacher-student behavior in primary level movement education classes. Although the system was promising, recording both teachers' verbal behavior and students' movement responses, further refinement of the system was recommended (Barrett, 1971).

From February 1972 to January 1973, under the direction of Anderson, a group of graduate students collected 83 videotapes of physical education classes from 60 schools in

three states (Anderson, 1975). The descriptive analysis work on these tapes resulted in various observational instruments designed specifically for use in physical education environments. The Occurrence of Physical Activities classified the transpiration and duration of each activity observed in the physical education class (Anderson, 1975). An instrument created by Fishman (1975) categorized teacher feedback during the acquisition of motor skills. Laubach's instrument isolated individual students and observed their personal behavior (Laubach, 1974). Used in elementary school physical education classes by Costello in 1977, Laubach's instrument found that 48.8% of students' time in physical education was spent in non-substantive activity.

Two remaining instruments developed from Anderson's collection of videotapes dealt solely with teacher behavior. Anderson (1975) developed an instrument that identifies and classifies teacher behavior into four functional capacities (performance of professional functions, modes of communication, persons with whom the teacher interacts, and topic of communication). In the same year Hurwitz (1975) developed a system, the Teacher's Role in the Learning Activity Selection Process (Tri-Lasp) System, which categorizes the teacher's role as "bystander, encourager, identifier, predictor, or director" (p. 2).

In 1975 Rankin developed an interaction analysis system to measure five verbal and five nonverbal categories of teacher-student interaction and used it to evaluate 42 elementary physical education classes. Rankin found that students who actively participated in physical education classes appeared more happy and content than inactive students.

In an attempt to more accurately describe the physical education teaching-learning environment, modifications of the popularly used FIAS were developed. In 1971 Dougherty added to FIAS a nonverbal meaningful activity category and a provision for identifying teacher verbal communication directed toward an individual and directed toward a group. A modification of FIAS by Melograno (1971) added an "n" next to the corresponding verbal behavior category when nonverbal communication was also taking place. A combination of FIAS and the nonverbal category system of Love-Roderick (1971) was used by Mancuso (1972) to report a predominance of nonverbal and motor behavior in interaction observed between secondary school physical education student teachers and their students. A precedent for the coding of nonverbal interaction in physical education had been set.

The most extensive and refined adaptation of FIAS for use in physical education settings was made by Cheffers in 1972. Cheffers' Adaptation of Flanders' Interaction

Analysis System (CAFIAS) classifies verbal and nonverbal interaction, teaching agents, and the structure of the activity session. CAFIAS also distinguished between constructive criticism and harsh criticism and between confusion and silence. Based on some of the same principles and ground rules of FIAS, Cheffers (1972) demonstrated his instrument's use as a research instrument by showing its validity when comparing "blind" interpretations of matrices with "live interpretations of videotapes made from selected class lessons.

IA has proven valuable in its ability to describe different teaching patterns. Since the ability to recognize and repeat patterns of behavior precludes any attempts to evaluate or teach these patterns, this initial step has been a critical one.

CAFIAS was used by Mancini (1974) with elementary school teachers and students to describe verbal and nonverbal teacher-student interaction resulting from the use of two distinct decision-making models. Results showed children involved in sharing the decision making process with the teacher showed an increased enjoyment of the program, increased positive interaction between the students and the teachers, increased student initiative and contributions, and an increased variety in teaching strategies.

In 1977 Mawdsley used CAFIAS to describe and compare the teaching behavior and teacher-student relationships of male and female movement education teachers. No significant relationship was found between the quality of teacher-student relations and teaching behavior.

Recent research has used interaction analysis systems as both dependent and independent variables. IA systems have been used to validate teaching styles (Chertok, 1977; Lamarre, 1976; Martinek, 1976). IA systems have also been used to measure the effect of training in CAFIAS on the preparation of pre-service teachers (Getty, 1977; Hendrickson, 1975; Rochester, 1976; Vogel, 1976).

In comparative studies IA systems have been used to distinguish teaching styles of male and female instructors (Bahneman, 1971; Faulkner, 1976; Keane, 1976; Nygaard, 1975). Using CAFIAS, Keane (1976) concluded leadership styles could be predicted from selected CAFIAS parameters. Bahneman (1971) used FIAS to isolate patterns of teaching behavior that separated male and female physical education teaching styles. Also using FIAS, Nygaard (1975) concluded male physical education teachers displayed a more direct teaching style than female physical education teachers. He found students of female teachers initiated more student talk although female teachers were more critical. Faulkner (1976), however, using CAFIAS could find no significant differences in teaching patterns of male and female pre-service teachers.

Analysis of Coaching

Too often coaches have been evaluated only by win-loss records (Friedrich, 1953; Struck, 1956; Wilson, 1977). Even if the goal of athletics were winning, records fail to reflect the uncontrollable factors of injury, parity of budgets, scheduling, practice time, or athletic ability than can hamper the records of even the best of coaches (Governali, 1974; Macholtz, 1978). In a study of Division II college football coaches, Kaplan (1976) found no significant relationship between leader behavior of coaches and win-loss records. Macholtz (1978) stated that winning is a product of coaching time, athlete time, budget, coaching ability, athletes' ability, frustration, competition, coaches' other responsibilities, and the program development.

Checklists have been developed to evaluate coaches that include many personality categories (Emery, 1962; Friedrich, 1953; Wilson, 1977). These fail, however, to put coaching acts into a descriptive repeatable behavior plus they are easily affected with bias.

In 1970 LaGrand used 304 athletes to rate the behavioral characteristics of coaches. Using a standardized semantic differential test, he found different hierarchy of behavioral characteristics discernible, but unique to different sports. Some of the dimensions included in LaGrand's scale were methods of teaching, use of discipline, ability to inspire,

enthusiasm, willingness to give help, and the ability to organize.

Clark (1974) had collegiate athletes assess successful women coaches and found athletes rated successful coaches as strongest in knowledge of the sport, ability to teach, and knowledge of coaching techniques. They were judged weakest in understanding of players as individuals, interest in players' out-of-school activities, and fairness in dealing with each player. The need to adequately describe this "ability to teach" and the "knowledge of coaching techniques" is crucial to developing successful coaches.

In a multi-dimensional scaling and factor analysis of coaching behavior as perceived by high school hockey players, Danielson, Zelhart, and Drake (1975) found that the majority of coaching behavior appeared to be related to the passing of information to and from the coach to the players. Much more emphasis was put on communicative behavior than on any other type of behavior.

In a study of the productivity, efficiency, and satisfaction of AAA high school basketball teams, Gilbert (1977) found that a consultative type of leadership rather than an authoritarian or participative style of leadership tended to maximize performance and satisfaction of players. This is contrary to Penman, Hastad, and Cords' (1974) findings which indicated "more successful coaches were, in fact, more authoritarian" (p. 155).

A descriptive analysis system was created by Tharp and Gallimore (1976) to adequately describe the unique and highly successful coaching style of John Wooden. They found that at least 75% of Wooden's coaching acts carried information; 50.3% was instructional, 8% was criticism followed by instruction on how to do it correctly, 2.8% was a demonstration of how to perform a skill, and 1.6% was a demonstration of how not to perform a skill. Praises (6.9%) and scolds (6.6%) also carried information. Tharp and Gallimore found the application of some of Wooden's coaching behavior, particularly his use of scold/reinstruction, valuable in other forms of teaching.

The Coding Behavior Assessment System was established by Smith, Smoll, and Hunt (1977) from the content analysis of coaching behaviors that occurred during practices and games. Smith et al. (1977) established and could train others to distinguish between 12 reactive and spontaneous behavior categories. Eight reactive behaviors included responses to desirable performances, mistakes, and misbehaviors. Four spontaneous behaviors included game related instruction, encouragement and organization, and irrelevant game communication.

In a study of teaching and coaching behaviors Bain (1978) found athletic team practices intensively focused upon the attainment of skilled performances. Instructional

achievement scores were high with coaches emitting a higher percentage of substantive comments (skill or knowledge related) and much more student praise and criticism than teachers.

The verbal and nonverbal behavior of three male teacher/coaches was studied by Kasson (1974) using the Kancuso Adaptation for Verbal and Nonverbal Observation System. He found more verbal and less nonverbal behavior in coaching situations than in teaching situations with more direct than indirect behavior being used in both settings. In coaching 56% of the total behavior was direct with lectures and verbal demonstrations being the predominant behaviors.

Using CAFIAS, Agnew (1977) studied 20 female teacher/coaches and found that coaches used more verbal questioning, more verbal acceptance and praise, and more nonverbal acceptance and praise than teachers. She also found that players in practice showed more pupil nonverbal initiated responses, teacher suggested than students in physical education classes. This significant increase in indirect behaviors favoring the coaching environment is in opposition to Kasson's findings of no significant differences in direct and indirect behaviors between the teaching and coaching environments.

Measuring Teacher Effectiveness

Criterion-of-effectiveness paradigms for teaching have been theoretical models that have attempted to identify a criterion for measuring teacher effectiveness. Treating effectiveness as a dependent variable, these paradigms have attempted to find possible teaching variables that affect this criteria (Gage, 1972). Initial research, including paradigms, centered around measurements of outcomes.

The most widely used paradigm began in the 1950's at the University of Wisconsin and included such correlates as inservice ratings, peer ratings, pupil gain scores, pupil ratings, and practice teaching grades. The relationship was sought between these as independent variables and the dependent variable of student outcomes (Barr et al., 1961).

Another paradigm combining elements of pure process and product research was initiated by an annotated 1000 source bibliography by Domas and Tiedeman in 1950. It dealt with pupil achievement assessed both objectively and subjectively, judgments by administrators, and performance on tests of "teaching ability."

After much research and hundreds of studies, thousands of correlation coefficients were found which were nonsignificant, inconsistent, and lacking in educational meaning (Gage, 1972). Other methods of looking at teachers and effectiveness were needed and gradually new paradigms

evolved. In 1957 Mitzel divided teacher effectiveness into four areas of concern: human characteristics, contingency factors that modify the complicated behaviors that merge on the educational process, classroom behaviors of pupils and teachers, and criteria measuring student changes in behavior. Viewing these four areas, Mitzel expressed the greatest hope for improvement of teacher effectiveness by the study of teacher and pupil classroom behaviors (Gage, 1972).

Process-product research was needed. Paradigms dealing with teaching only as outcomes or only as processes (information processing or interaction) gave way to models of teaching as oscillating and repetitive interaction starting with thought by the teacher, action, thought by the pupil, and action by the pupil (Gage, 1972). Models were required that specified teaching practices and cited explicit correlated outcomes (Brophy, 1976; Coates & Thoresen, 1976; Gage, 1968; Locke, 1977; Medley & Mitzel, 1959).

The most comprehensive list of teacher behaviors that had a direct and significant effect on student achievement was gathered and published by Rosenshine and Furst in 1971 from a comprehensive review of literature on correlation studies in which student achievement was the criterion measure. This list was later revised to include the

following nine variables: (a) clarity, (b) variability or flexibility, (c) enthusiasm, (d) task-oriented and/or business like behavior, (e) criticism, (f) teacher indirectness, (g) student opportunity to learn criterion material, (h) use of structuring comments, and (i) multiple levels of questions or cognitive discourse (Rosenshine & Furst, 1973). Support for the validity of these variables comes from numerous sources.

Individual variables were empirically supported as early as the 1960's. Amidon and Flanders (1971) documented indirect behaviors as being positive influences on student learning as did Soar (1967). Indirect behaviors were those of actively seeking student ideas, use of student ideas, positive reinforcement of student participation, and acceptance or clarification of pupil feelings.

The positive aspects of praise, as opposed to the negative aspects of criticism, in the enhancement of student learning has been documented by Hughes (1973), Trichero (1974), and Sandefur and Adams (1976). Sandefur and Adams (1976) stated that praise, encouragement, and indirect teaching behaviors resulted in alert, responsible, confident, and initiating students.

Total support for the nine variables of Rosenshine and Furst also came from Good, Biddle, and Brophy (1975) in their book, Teachers make a difference, where they stated

that these variables did, indeed, relate to student learning. Brophy and Evertson (1976), although supporting the list, stated it is not the final word in process-product evaluation because some of the relationships are only moderate. They did, however, view it as a definite improvement over previous speculative lists. Kennedy and Bush (1976) have also endorsed the list but saw the need to test and define its variables more extensively until the variables can be consistently measured so that they can differentiate between teachers not relative to a particular group or study.

CAFIAS has been linked with Rosenshine and Furst's variables in at least two studies in an attempt to see if behaviors related to training in CAFIAS were also related to teaching effectiveness. An observational rating system devised by Keilty (1975) solicited the opinion of a panel of judges on the degree to which teachers displayed the 11 behavior variables first identified by Rosenshine and Furst (1971). Although Keilty established reliability measures for his questionnaire of .83 for internal consistency, .96 for inter-observer reliability, and .90 for rater agreement, he was unable to find a relationship between teacher effectiveness and the variables measured by CAFIAS. He speculated that this result might be due to an inadequate period of time for training in CAFIAS.

In a study done by Rochester in 1976 a relationship was shown between training in CAFIAS and teacher effectiveness variables identified by a modification of Keilty's (1975) instrument. Teacher talk, teacher nonverbal, confusion, student talk, and student nonverbal CAFIAS variables were correlated with clarity; variability; opportunity to learn; accepting, encouraging, and indirectness; use of structuring and summary comments; and types of questions. These same CAFIAS variables were also found to be correlated with variability, business-like task oriented behavior, and probing.

While limited research has been done on teaching effectiveness and the descriptive analysis of coaching behaviors using CAFIAS, no research has tied the two variables together. If good coaching is "good teaching" (Moore, 1970), then research must be done not only to descriptively analyze coaching but also to distinguish patterns of behavior that vary between effective and less effective coaches.

Summary

The scientific analysis of teaching was stimulated by Anderson in 1939 when he developed an observation system to identify direct and indirect teaching acts and the affective resultant behavior of children. Interaction analysis systems, begun with the work of Bales (1950), attempted to categorize, observe, record, and analyze the

behavioral events of teachers and students as they occurred. The most popular interaction analysis system used was FIAS which analyzed verbal communication in the classroom from the direct and indirect polar dimensions. Later research using FIAS showed the direct/indirect ratio of teaching behaviors affected student achievement.

Although some successful research using FIAS was initiated in physical education, several researchers noted the importance of nonverbal interaction in adequately describing the relevant teacher-student interaction in the gymnasium. New interaction analysis systems were developed to measure nonverbal as well as verbal interaction. The most widely used system was Cheffers' Adaptation of Flanders' Interaction Analysis System. Developed to specifically deal with physical education settings, CAFIAS described verbal and nonverbal interaction, different teaching agents, and different class structures. CAFIAS and alternate IA systems have been effectively used as dependent and independent variables in recent physical education research.

Coaching has been recognized as a form of teaching and has undergone only recent scientific analysis. Traditionally coaches were evaluated on win-loss percentages, but evaluations failed to consider extenuating circumstances or methods of achieving end results. Many evaluation forms and multi factor analyses of coaching have found that the

ability of a coach to relay information is a critical factor in a coach's effectiveness. Other studies have sought to descriptively analyze coaching by identifying similar and dissimilar interaction patterns of coaches and teachers.

Research into the effectiveness of teaching has led to many theories, teaching paradigms, and evaluation methods. A comprehensive review of literature by Rosenshine and Furst (1973) led to nine teaching variables that resulted in student growth. Supported by much outside research this list of variables has been used by Keilty (1975) and Rochester (1976) in studies seeking a relationship between training in CAFIAS and teaching effectiveness variables. Results have been varied.

Chapter 3

METHODS AND PROCEDURES

This chapter deals with the methods and procedures undertaken in the pursuit of this investigation. It includes the selection of subjects, testing instruments, coder reliability, judges' reliability, methods of data collection, scoring of data, and treatment of data.

Selection of Subjects

The subjects of this study were 30 interscholastic high school coaches selected from the central New Hampshire, central New York, and northern New York areas. All subjects were coaching during the 1977-1978 winter sports season and were videotaped twice with their permission.

Testing Instruments

Cheffers' Adaptation of Flanders' Interaction Analysis System was used in this study to systematically collect data every 3 seconds on teaching behavior variables. It provided data for analyzing direct and indirect verbal and nonverbal teacher behavior, pupil response behavior, class structure, and teaching agencies employed. The validity of CAFIAS has been shown beyond the .05 level of significance using the "blind-live" methods of comparison between CAFIAS and FIAS (Cheffers, 1972).

The Coaches' Performance Criteria Questionnaire used in this study was revised from the Teacher Performance

Criteria Questionnaire developed by Keilty in 1975 and based on variables identified by Rosenshine and Furst (1971) as being related to student growth. Three measures of reliability were used on the TPCQ. The Kuder-Richardson Formula 20 established a .83 measure of internal consistency. Reliability was determined to be .96 using Eber's formula. A final measure of reliability of ratings of .90 was found for the coefficient of agreement of correct responses to total number of responses for each lesson rated in Keilty's original study (Keilty, 1975). Minor semantic modifications of the TPCQ were made to direct Keilty's original questions that dealt with the nine significant teacher variables identified by Rosenshine and Furst (1973) away from teachers and students and toward coaches and players.

Coder Reliability

Coder reliability for Dr. Victor H. Mancini was assessed using Spearman rank-order correlation on two videotapes of two randomly selected subjects in each group coded on two different days. The results are outlined in Appendix B. In order to insure competency in the use of CAFIAS Dr. Victor H. Mancini took the "Observer System in Human Movement" course offered at Boston University and received additional training from Professor Cheffers.

Judges' Reliability

Judges' reliability on the CPCQ was assessed by using an intraclass correlation to assess total mean differences between judges on all subjects.

Methods of Data Collection

Data for analysis of coaching behaviors were collected in the 1977-1978 winter sports season during actual high school practice sessions. Coaches were phoned for permission to tape two practice sessions, and appointments were made in advance to tape random uninterrupted 30-minute segments of practices on 2 separate days. Microphones were used to capture all verbal interaction, and the videotapes were taken by an individual with experience in using visual-aid equipment to capture critical teacher-student interaction. Only team sports were taped.

Four judges, experienced teachers who were enrolled in the course "Analysis of Teaching Behavior" offered through the Graduate Department of Physical Education at Ithaca College, Ithaca, New York, viewed the complete tape recording of each coach. Instructions read to the judges appear in Appendix D. Judges were then asked to rate each coach on all nine variables measured by the CPCQ.

Without knowing the results of the CPCQ, the tapes were coded by a reliable coder using CAFIAS. Behaviors were recorded on a tally sheet in sequential order.

Scoring of Data

Responses to each of the nine questions of the CPCQ were recorded in scores ranging from one (never) to five (always or consistently). The test appears in Appendix E. Totals were then established for the sum of all judges' scores for each subject, and a mean was calculated.

Data collected from the coding of coaching sessions using CAFIAS were recorded on computer data cards for analysis. The computer print out included matrices, ratios, and percentages for the eight variables identified by CAFIAS. A mean score across each variable from the two coaching sessions recorded for each subject was used to represent an individual coach.

Treatment of Data

The median score of the total means on the CPCQ for each subject was used to distinguish 15 coaches exhibiting high teacher-effectiveness behaviors from those 15 coaches exhibiting lower teacher-effectiveness behaviors. The means of the eight variables identified by CAFIAS for each group were then submitted to multivariate analysis of variance to determine if significant differences extisted between the two groups. Which of the eight CAFIAS variables contributed independently to differences between the two groups was identified using univariate analyses of variance. The discriminant function coefficients of the eight CAFIAS

variables were also calculated to indicate those variables most sensitive to group difference in relation to every other variable. Significance beyond the .05 level was used to test the hypothesis.

Summary

The subjects used in this study were 30 high school coaches selected during the 1977-78 winter sports season from active coaches in the central New Hampshire, central New York, and northern New York areas. Predetermined practice sessions were videotaped for 30 random, uninterrupted minutes.

Coaching effectiveness was measured by a panel of four judges who viewed all tapes and scored each coach on the CPCQ. A median score of the average point totals of all four judges for each coach was used to separate 15 effective from 15 less effective coaches.

Coaching sessions were coded according to CAFIAS. These results were recorded on computer cards for computer analysis. Mean ratios and percentages for eight CAFIAS variables showed interaction patterns for each coach.

A multivariate analysis of variance determined if there was an overall significant difference between groups. Univariate analyses of variance were used to find which of the eight CAFIAS variables contributed independently to differences between the two groups. The relative contribution

of all variables to between group differences was calculated using discriminant function analysis. Significance beyond the .05 level was used to test the hypothesis.

Chapter 4

ANALYSIS OF DATA

This chapter presents and interprets the results of the statistical analysis of data from this study on the coaching behaviors of effective and less effective coaches. The findings are presented in terms of the reliability of the coder and judges, the analysis of coaching behavior data, and a summary.

Reliability of Coder and Judges

Coder reliability was established by having the coder view and code the coaching tapes of two randomly selected subjects from each group on two separate days. A Spearman rank-order correlation was used to compare the top 10 cells for each coding session. A mean score correlation of .98 was established which was adequate to indicate reliability. The data from the comparison of observations are shown in Table 1.

Judges' reliability was obtained through an intraclass correlation of the variance between judges on the total scores of each subject on all variables. The mean score range between judges was .40 and an intraclass correlation of .991 was sufficient to show judges' reliability.

Analysis of Coaching Behavior Data

A multivariate analysis of variance was performed on eight CAFIAS variables of effective and less effective coaches.

Table 1

Coder Reliability

Subject	r_s	M
203 Less Effective Coach	.99	.98
210 Less Effective Coach	.99	
102 Effective Coach	.97	
110 Effective Coach	.98	

Note. Coder reliability was determined by a Spearman rho comparison of the coding of coaching behaviors for two independent observations of the same practice tape.

The mean scores and standard deviations for the eight CAFIAS variables resulting from the coding of practice sessions of effective and less effective coaches are presented in Table 2. Mean scores show that effective coaches scored higher than less effective coaches on the first six variables. The multivariate analysis of these variables resulted in a Wilks' Lambda value of .3019 with one and 28 degrees of freedom. These findings, presented in Table 3, are significant at the .05 level and lead to a rejection of the null hypothesis that there will be no statistically significant differences in coaching behaviors between effective and less effective coaches.

Univariate analyses of variance, used to determine those statistically significant variables that contributed to group differences are shown in Table 4. Using univariate F-ratios five variables were found to be statistically significant. These significant variables included teacher use of acceptance and praise, verbal ($F = 55.0739$); teacher use of acceptance and praise, nonverbal ($F = 25.7068$); pupil verbal initiation, teacher suggested ($F = 17.4256$); pupil nonverbal initiation, teacher suggested ($F = 18.6787$); and pupil nonverbal initiation, student suggested ($F = 6.3989$). A comparison of means showed the first four significant variables favored the effective coaches while the fifth favored the less effective coaches.

Table 2

Means and Standard Deviations of Eight CAFIAS Variables

CAFIAS Variables	Effective Coaches		Less Effective Coaches	
	M	SD	M	SD
1. Teacher Questions, Verbal	11.56	5.88	8.25	5.13
2. Teacher Questions, Nonverbal	3.33	2.65	2.95	4.86
3. Teacher Acceptance and Praise, Verbal	61.30	14.01	23.78	13.68
4. Teacher Acceptance and Praise, Nonverbal	58.08	20.96	23.23	16.42
5. Pupil Verbal Initiation, Teacher Suggested	85.45	12.95	58.55	21.33
6. Pupil Nonverbal Initiation, Teacher Suggested	55.96	25.10	21.35	18.20

Table 1 (continued)

CAFIAS Variables	Effective Coaches		Less-Effective Coaches	
	M	SD	M	SD
7. Pupil Verbal Initiation, Student Suggested	10.65	7.44	14.94	7.33
8. Pupil Nonverbal Initiation, Student Suggested	7.14	7.03	14.31	8.43

Table 3

Multivariate Analysis of Variance Contrasting Effective and Less Effective Coaches Using Eight CAFIAS Variables

Source	df	Λ
Between Groups	1,28	.3019*

*$p < .05$.

Table 4

Univariate Analyses of Variance Contrasting Effective and Less Effective Coaching Behaviors Using CAFIAS Variables

CAFIAS Variable	df	F
1. Teacher Questions, Verbal	1,28	2.7086
2. Teacher Questions, Nonverbal	1,28	.0728
3. Teacher Acceptance and Praise, Verbal	1,28	55.0739*
4. Teacher Acceptance and Praise, Nonverbal	1,28	25.7068*
5. Pupil Verbal Initiation, Teacher Suggested	1,28	17.4256*
6. Pupil Nonverbal Initiation, Teacher Suggested	1,28	18.6787*
7. Pupil Verbal Initiation, Student Suggested	1,28	2.5283
8. Pupil Nonverbal Initiation, Student Suggested	1,28	6.3989*

*$p < .05$.

Discriminant function analysis was used to determine in linear functions the percentage of contribution of each variable to between group differences. Table 5 shows that of the 69.7225% of the variance between groups that could be accounted for by discriminant function analysis, teacher verbal acceptance and praise and pupil verbal initiation, teacher suggested accounted for 44.8795% and 10.1863% respectively. While the other six variables all accounted for some variance, their total contribution to between group differences was only 14.6577%.

Summary

The multivariate analysis of variance used to determine if significant differences existed in the teaching behaviors of effective and less effective coaches showed a significant Wilks' Lambda value of .3109. The null hypothesis that there will be no significant differences between coaching behaviors of effective and less effective coaches was rejected at the .05 level of significance.

Univariate analyses of variance were used to determine what variables, independent of each other, significantly contributed to the differences between groups. Those variables showing a significant difference between groups were teacher use of acceptance and praise, verbal; teacher use of acceptance and praise, nonverbal; pupil verbal initiation, teacher suggested; pupil nonverbal initiation,

Table 5

Discriminant Function Analysis and Percentage of Contribution of the Eight CAFIAS Variables for Conditions

CAFIAS Variables	Standardized Discriminant Weighting	Percentage of Contribution
3. Teacher Acceptance and Praise, Verbal	-.66993	44.8795
5. Pupil Verbal Initiation, Teacher Suggested	-.31919	10.1863
7. Pupil Verbal Initiation, Student Suggested	-.18686	3.4916
2. Teacher Questions, Nonverbal	-.16034	2.5708
6. Pupil Nonverbal Initiation, Teacher Suggested	-.09928	.9857
8. Pupil Nonverbal Initiation, Student Suggested	.06524	.4256
4. Teacher Acceptance and Praise, Nonverbal	-.05502	.3027
1. Teacher Questions, Verbal	-.03012	.0907

teacher suggested; and pupil nonverbal initiation, student suggested.

A discriminant analysis was used to determine the percentage of contribution of each variable to the linear function that maximized the distance between the two groups. The two variables that contributed the most to the discriminant function of between group differences were teacher verbal acceptance and praise and pupil verbal initiation, teacher suggested.

The analysis of data revealed there are differences in coaching behaviors between effective and less effective coaches.

Chapter 5

DISCUSSION OF RESULTS

This investigation used a modification of Keilty's Teacher Performance Criteria Questionnaire to separate audio-visual practice tapes into two groups: those led by effective coaches and those led by less effective coaches. The tapes were then coded using CAFIAS to see if differences existed between the interaction patterns of the two groups of coaches.

The TPCQ has been used by two previous investigators, Keilty (1975) and Rochester (1976), to distinguish between teachers that used and those that failed to use those teaching behaviors identified by Rosenshine and Furst (1971) that had been verified through a review of process-product research to be related to student growth. Although process-product research has not previously been used to evaluate coaching, coaching has been described as teaching (Moore, 1970; Sabock, 1973). Clark (1974) found that college athletes considered the ability to teach as one of the top characteristics that distinguished between successful and unsuccessful women coaches.

CAFIAS was used as an observation tool to objectively categorize behaviors that occurred in all coaching sessions. Based on FIAS which has had extensive use in educational research (Shiffman, 1976), CAFIAS can also capture nonverbal

behaviors, teaching agents, class structures, and different types of student responses (Cheffers, 1972). The analysis of nonverbal behaviors is particularly relevant in an environment specializing in the magnification of physical prowess. A valid and reliable instrument (Cheffers, 1972) CAFIAS has been used by researchers in analyzing many aspects of the physical education environment.

Interaction analysis systems have not, however, been used extensively in coaching environments. The evaluation of the effectiveness of coaches has been left to win-loss records or subjective checklists, both of which are affected by factors beyond a coach's control. Tharp and Gallimore (1976) used a descriptive analysis system to describe the highly successful coaching style of John Wooden, but failed to augment their study with the complementary evaluation of a less effective coach which would have highlighted the significantly different, if any, productive behaviors of Wooden. Kasson (1974) used the Mancuso Adaptation for Verbal and Nonverbal Observation System to determine that three male teacher/coaches had a similar predominance of direct behavior patterns in both environments. Agnew (1977) used CAFIAS to find 20 female coaches were more indirect in their coaching than in their teaching. Neither Kasson or Agnew, however, compared or contrasted various coaching behaviors of individuals or groups.

The 30 coaches taped in this study were divided into two groups of effective and less effective coaches by the median of the average CPCQ scores used by a panel of four judges to evaluate all coaches. Each coaching session was systematically described using CAFIAS, and the means of the CAFIAS variables of the effective and less effective coaches were compared.

The multivariate analysis of variance used in this study revealed a Wilks' Lambda value above the .05 level of statistical significance. This significant value showed that the teaching behaviors identified by CAFIAS were different for effective and less effective coaches. Univariate analyses of variance revealed five out of eight CAFIAS variables were individually significant to the between group differences. Examination of the means of the significant variables of both groups indicated that the variables of teacher use of acceptance and praise, verbal; teacher use of acceptance and praise, nonverbal; pupil verbal initiation, teacher suggested; and pupil nonverbal initiation, teacher suggested favored the effective coaches. Pupil nonverbal initiation, student suggested was favored by the group of less effective coaches.

Further analysis revealed that while discriminant function analysis could account for only 69.7225% of the variance between groups, teacher use of acceptance and praise, verbal

and pupil verbal initiation, teacher suggested were the greatest contributors to between group variance. They accounted respectively for 44.8795% and 10.1863% of the between group variance. Other variables combined only accounted for 14.6577% of the between group variance.

Tharp and Gallimore (1976) found that at least 75% of John Wooden's coaching acts carried information. A multi-dimensional scaling and factor analysis of coaching behavior as perceived by high school hockey players by Danielson, Zelhart, and Drake (1975) found that the majority of coaching behavior appeared to be related to the passing of information to and from the coach to the player. In a study of teaching and coaching behaviors, Bain (1978) found athletic team practices intensively focused upon the attainment of skilled performances. With coaching documented as possessing a dominance of teaching behaviors, it appears coaching effectiveness would be directly related to the ability of a coach to teach.

Rosenshine and Furst's (1973) research of process-product research led to a list of nine teaching variables that affected student growth including clarity, variability or flexibility, enthusiasm, task-oriented and/or business-like behavior, criticism, teacher indirectness, student opportunity to learn criterion material, use of structuring comments, and multiple levels of questions or cognitive discourse.

A relationship between these variables and the variables of CAFIAS was shown in a study by Rochester (1976). She found that teacher talk, teacher nonverbal, confusion, student talk, and student nonverbal CAFIAS variables were correlated with clarity, variability, opportunity to learn, accepting, encouraging and indirectness, use of structuring and summary comments, and types of questions. The same CAFIAS variables were also correlated with variability, business-like or task-oriented behavior, and probing. Keilty (1975) did not find training in CAFIAS showed any relationship to Rosenshine and Furst's variables, but suggested too short a training period in CAFIAS as a possible explanation of his results.

In this study effective coaches were shown to have significantly higher mean scores on the CAFIAS variables of teacher use of acceptance and praise, verbal; teacher use of acceptance and praise, nonverbal; pupil verbal initiation, teacher suggested; and pupil nonverbal initiation, teacher suggested. The first two variables are verbal and nonverbal components of indirect teacher behavior. They include such behaviors as praise, encouragement, use and development of student ideas, smiles, laughs to encourage, nods, and sympathetic embraces. This predominance of behaviors also implies a complete involvement in practice, or an aura of enthusiasm. The positive aspects of praise in the enhancement of student learning have been documented by Hughes (1973),

Trinchero (1974) and Sandefur and Adams (1976). The value of indirect teaching behaviors as positive influences on student learning have been documented by Amidon and Flanders (1971) and Soar (1967). Sandefur and Adams (1976) state that praise, encouragement, and indirect teaching behaviors result in alert, responsible, confident, and initiating students. Indirect teaching behaviors and enthusiasm were identified by Rosenshine and Furst (1973) as being related to student growth.

The significantly higher mean scores of effective coaches for the CAFIAS variables of pupil initiation, teacher suggested and pupil nonverbal initiation, teacher suggested demonstrate the use of variable and flexible discourse by the coach that results in pupil verbal or nonverbal responsiveness, student input, and additional learning opportunities. In a study of the productivity, efficiency, and satisfaction of AAA high school basketball teams, Gilbert (1977) found that a consultative type of leadership rather than an authoritarian or participative style of leadership tended to maximize performance and satisfaction of players. In this study players were not told all the answers, but were asked to think, reason, and respond to teacher suggested problems. Multiple levels of questions or cognitive discourse, variability or flexibility, and student opportunity to learn criterion materials are three of the variables Rosenshine and Furst (1973) found related to student growth.

One CAFIAS variable, pupil nonverbal initiation, student suggested favored the less effective coaches in this study. The mean of this variable for less effective coaches was 14.31, but discriminant function analysis showed that in relation to all the other variables it had little influence on between group differences. Pupil nonverbal initiation, student suggested represents a ratio of student initiated nonverbal behaviors over student nonverbal rote responses, student nonverbal predictable evaluative responses, and student initiated nonverbal behaviors. Because student nonverbal initiated behaviors are found in both the numerator and denominator of the ratio, scores over 50 would represent a predominance of student nonverbal initiated behaviors while numbers below 50 would favor the other two variables found in the denominator of the equation. The mean ratio of 14.31 for pupil nonverbal initiation, student suggested behavior in the coaching styles of less effective coaches signifies a greater predominance of student nonverbal rote responses and student nonverbal predictable evaluative responses than student initiated nonverbal behaviors. However, a lower ratio of 7.14 for this same variable in the practice sessions of effective coaches shows effective coaches had less student initiated nonverbal behavior than less effective coaches. Because student nonverbal initiated behaviors are not directly related to assigned task achievement,

this variable suggests a small percentage of practice time and energy is being spent by players in physical activities not suggested by the coach. Bain (1978) found that athletic team practices intensely focused upon the attainment of skilled performances. With most teams having limited time and facilities during the winter months to accomplish established goals, this variable seems less than desirable. Although the reason for the wasted time cannot be further dissected by the CAFIAS variables, it is reasonable to assume that pupil nonverbal initation, student suggested may stem from a lack of clarity or task-oriented behavior by the coach. The presence of clarity and task-oriented behavior increase student learning (Rosenshine & Furst, 1973).

The null hypothesis of this investigation that there would be no differences in coaching behaviors of effective and less effective coaches was rejected. Divided into groups by the teaching variables related to student growth that were identified by Rosenshine and Furst (1973), coding of audio-visual tapes of practice sessions through the use of CAFIAS showed significant differences between groups. This is consistent with research which views teaching as a process-product paradigm where a teacher (or coach) has substantial influence over student achievement through the interaction processes used to transmit and share information. Effective coaches would, consequently, have different and more efficient communication patterns than less effective coaches.

Summary

The null hypothesis that there will be no significant differences between coaching behaviors of effective and less effective secondary school coaches was not supported by the findings of this investigation. Using CAFIAS to code and describe all taped coaching sequences, five variables significantly differed between the two groups, and the two groups significantly differed from each other.

Studies using interaction analysis to identify effective coaching characteristics have just begun. Kasson (1974) and Agnew (1977) used interaction analysis systems in descriptive studies to compare teaching and coaching behaviors of the same individuals, but neither compared coaching styles across various individuals.

Research by Tharp and Gallimore (1976) and Danielson et al. (1974) found the most predominant coaching behavior was behavior relating to the relaying of information from coach to players. Bain (1978), comparing teaching and coaching behaviors, found in coaching an intense emphasis upon the attainment of skilled performances.

If the relaying of information is the primary source of communication engaged in to obtain the skill oriented goals of coaching, characteristics found influential in the teaching-learning process should distinguish effective from less effective coaches. The CAFIAS variables found

significant in this study included teacher use of acceptance and praise, verbal; teacher use of acceptance and praise, nonverbal; pupil verbal initiation, teacher suggested; and pupil nonverbal initiation, teacher suggested. These variables favoring the effective coaches bear objective support for the subjective process-product variables of Rosenshine and Furst (1973) that were used to divide the 30 coaches into two groups. This study also supports the research of Rochester (1976) which showed a relationship between CAFIAS variables and the variables relating to student growth identified by Rosenshine and Furst (1971).

Pupil nonverbal initiation, student suggested was a significant variable which favored less effective coaches. A low mean score for this variable indicates it is not a dominant behavior found in practices of either group. Discriminant function analysis indicated it has little influence on between group differences and examination of the coaching situation suggests it is not a desirable characteristic.

Effective coaches were found to have interaction patterns that reflected more enthusiasm, variability, indirectness, and multiple levels of questions than the interaction patterns of less effective coaches. Teams of effective coaches were also accorded more opportunities to learn criterion materials than teams of less effective coaches.

Chapter 6

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS FOR FURTHER STUDY

Summary

This study was undertaken to compare the behaviors of effective and less effective secondary school coaches. With their permission the subjects were audio-videotaped twice for 30 random minutes coaching winter sports in the central New Hampshire, central New York and nothern New York areas. The tapes were viewed by four experienced teachers who scored coaches according to the CPCQ which was based on variables identified by Rosenshine and Furst (1973) as having an effect on student growth. A median of the average scores on the CPCQ for each subject was used to separate effective from less effective coaches. The tapes were then coded by Dr. V. H. Mancini through the use of CAFIAS. Sequential behaviors were placed on computer cards for analysis. The computer print out included matrices and tabulated ratios and percentages for eight CAFIAS variables. These ratios and percentages were tallied for each of the two taping sessions for each individual, and a mean score was calculated to represent each subject.

A multivariate analysis of variance found a significant difference beyond the .05 level between the coaching behaviors identified by CAFIAS of effective and less effective coaches.

The null hypothesis which stated there was no significant differences in interaction patterns of effective and less effective coaches was rejected. Univariate analyses of variance were used to determine the individual capacity of each of the CAFIAS variables to differentiate between groups. Five of eight CAFIAS variables were significant. Teacher use of acceptance and praise, verbal; teacher use of acceptance and praise, nonverbal; pupil verbal initiation, teacher suggested; and pupil nonverbal initiation, teacher suggested favored the effective coaches. Pupil nonverbal initiation, student suggested favored less effective coaches. Discriminant function analysis showed in linear functions the percentage of contribution of each variable to between group differences. The largest contributing variable was teacher verbal acceptance and praise followed in importance by pupil verbal initiation, teacher suggested. Although the six remaining variables all contributed something, their total contribution was less than 15% of the between group difference.

Conclusions

The following conclusions could be supported by the findings of this investigation:

1. Effective coaches used more verbal and nonverbal acceptance and praise than less effective coaches.

2. More pupil verbal and nonverbal behavior, teacher suggested were observed in the practices of effective coaches.

3. Practices of less effective coaches, although dominated by teacher suggested student nonverbal rote and evaluative responses, also included more student initiated nonverbal activity than the practices of effective coaches.

4. CAFIAS can objectively distinguish differences between behaviors of coaches exhibiting effective or less effective teaching characteristics subjectively identified by a questionnaire based upon the process-product variables identified by Rosenshine and Furst (1973).

5. Effective coaches were more indirect in their teaching behavior than less effective coaches.

Recommendations for Further Study

The following recommendations are made for future research:

1. Undertake a study comparing interaction patterns of coaches with player satisfaction.

2. Investigate player skill level as a moderator variable in the interaction patterns of coaches.

3. Investigate the effect of the training of CAFIAS on the behaviors of coaches.

4. Compare the coaches' perceptions of the interactions occurring in their situations with the results of what actually occurred.

5. Investigate the relationship of years of experience and win-loss records to student, peer, or administrator evaluations of coaches and coaches' interaction patterns.

6. Equalize skill levels of players and evaluate the improvement of teams led by effective and less effective coaches.

Appendix A

THE CATEGORIES OF CHEFFERS' ADAPTATION OF FLANDERS' INTERACTION ANALYSIS SYSTEM

Categories	Teacher Environment (E) Student (S) Verbal	Relevant Behaviors	Nonverbal
2-12	2 Praises, commends, jokes, encourages	Face:	12 Smiles, nods with smile, (energetic) winks, laughs
		Posture:	Claps hands, pats on shoulder, places hand on head of student, wrings student's hand, embraces joyfully, laughs to encourage, spots in gymnastics, helps child over obstacles
3-13	3 Accepts, clarifies, uses, and develops suggestion and feeling by the learner	Face:	13 Nods without smiling, tilts head in empathetic reflection, sighs empathetically
		Posture:	Shakes hands, embraces sympathetically, places hand on shoulder, puts arm around shoulder or waist, catches an implement thrown by student, accepts facilities
4-14	4 Asks questions requiring student answer	Face:	14 Wrinkles brow, opens mouth, turns head with quizzical look

CATEGORIES (continued)

Categories	Verbal	Relevant Behaviors	Nonverbal
	4		14
4-14		Posture:	Places hands in air, waves finger to and fro anticipating answer, stares awaiting answer, scratches head, cups hand to ear, stands still half turned towards person, awaits answer
	5		15
5-15	Gives facts, opinions, expresses ideas, or asks rhetorical questions	Face:	Whispers words inaudible, sings, or whistles
		Posture:	Gesticulates, draws, writes, demonstrates activities, points
	6		16
6-16	Gives directions or orders	Face:	Points with head, beckons with head, yells at
		Posture:	Points finger, blows whistle, holds body erect while barking commands, pushes child through a movement, pushes a child in a given direction
	7		17
7-17	Criticizes, expresses anger or distrust, sarcastic or extreme self-reference	Face:	Grimaces, growls, frowns, drops head, throws head back in derisive laughter, rolls eyes, bites, spits, butts with head, shakes head

CATEGORIES (continued)

Categories	Verbal	Relevant Behaviors	Nonverbal
	7		17
7-17		Posture:	Hits, pushes away, pinches, grapples with, pushes hands at student, drops hands in disgust, bangs table, damages equipment, throws things down
	8		18
8-18	Student response that is entirely predictable, such as obedience to orders, and responses not requiring thinking beyond the comprehension phase of knowledge	Face:	Poker face response, nods, shakes, gives small grunts, quick smile
		Posture:	Moves mechanically to questions or directions, responds to any actions with minimal nervous activity, robot like
	Eine (8)		Einteen (18)
Eine (8\)	Predictable student responses requiring some measure of evaluation and synthesis from the student, but must remain within the province of predictability. The initial behavior was in response to teacher initiation	Face:	A "What's more, Sir" look, eyes sparkling
Eineteen (18\)		Posture:	Adds movements to those given or expected, tries to show some arrangement requiring additional thinking; e.g., works on gymnastic routine, dribbles basketball, all game playing

CATEGORIES (continued)

Categories	Verbal	Relevant Behaviors	Nonverbal
	9		19
9-19	Pupil, initiated talk that is purely the result of their own initiative and that could not be predicted	Face:	Interrupting sounds, gasps, sighs
		Posture:	Puts hands up to ask questions, gets up and walks around without provocation, begins creative movement education, makes up own games, makes up own movements, shows initiative in supportive movement, introduces new movements into games not predictable in the rules of the game
	10		20
10-20	Stands for confusion, chaos, disorder, noise, much noise	Face:	Silence, children sitting doing nothing, noiselessly awaiting teacher just prior to teacher entry, etc.

Note. Cited from Cheffers, Amidon, & Rodgers, 1974.

Appendix B

CODER RELIABILITY[a] FOR SELECTED SUBJECTS

USING SPEARMAN'S RHO

Subject 203--Less Effective Coach

Top 10 Cells[b]	Rank Observation One[c]	Rank Observation Two	d[d]	d^2
18-20	1.5	1	.50	.25
20-18	1.5	2	.50	.25
6-18	3	3	.00	.00
18-6	4	4	.00	.00
16-18	5	5	.00	.00
18-5	6	6	.00	.00
18-16	7	7	.00	.00
5-18	8	8	.00	.00
15-5	9	9	.00	.00
18-7	10	10	.00	.00
Total				.50

[a].9969

[b]Top 10 cells listed refer to the order of coder's numerical frequency.

[c]Rank observation one and observation two refer to the origin of the coding.

[d]d refers to the differences between the ranks of each cell for observation one and observation two.

Name Subject 203 | Grade Secondary

Class Observation One | CAFIAS | Setting Coaching

No. 45 G, B, Coed | Time Afternoon

	2	12	3	13	4	14	5	15	6	16	7	17	8	18	8\	18\	9	19	10	20
2									1					5						
12									1					1						
3					1		2							1						
13																				
4													4	1						
14														1						
5							1	1			2			21	1	1	1	1		
15							19	9	9	3					1	1	1	1		
6							6	6	3					61						
16									1					30						
7							2		3	1				7						1
17							1													
8							2	1	2	1				1						
18	4	1	2		5	1	27		44	26	14	1	1	7	1	1				111
8\			2																	
18\			2																	
9							1													
19							1													
10																				
20									1					111						
Tea	6	2	6	0	6	1	62	17	65	31	16	1	5	247	3	3	2	2	0	112
Env																				
Stu																				
Tot	6	2	6	0	6	1	62	17	65	31	16	1	5	247	3	3	2	2	0	112
%	1.0	.3	1.0	0	1.0	.2	10.6	2.9	11.1	5.3	2.7	.2	.9	42.1	.5	.5	.3	.3	0	19.1

Name Subject 203
Class Observation Two
No. 45 G, B, Coed

CAFIAS

Grade Secondary
Setting Coaching
Time Afternoon

	2	12	3	13	4	14	5	15	6	16	7	17	8	18	8\	18\	9	19	10	20
2									1					5						
12									1					1						
3					1		2							1						
13																				
4													4	1						
14														1						
5							1	1				2		21	1	1	1	1		
15							19	9	9	3					1	1	1	1		
6							6	6	3					61						
16									1					30						
7							2		3	1				7						1
17							1													
8							2	1	2	1				1						
18	4	1	2		5	1	27	44	26	14	1	1	7	1	1					112
8\			2																	
18\			2																	
9							1													
19							1													
10																				
20								1						111						
Tea	6	2	6	0	6	1	62	17	65	31	16	1	5	247	3	3	2	2	0	113
Env																				
Stu																				
Tot	6	2	6	0	6	1	62	17	65	31	16	1	5	247	3	3	2	2	0	113
%	1.0	.3	1.0	0	1.0	.2	10.6	2.9	11.1	5.3	2.7	.2	.9	42.1	.5	.5	.3	.3	0	19.1

CODER RELIABILITY[a] FOR SELECTED SUBJECTS

USING SPEARMAN'S RHO

Subject 210--Less Effective Coach

Top 10 Cells[b]	Rank Observation One[c]	Rank Observation Two	$\underline{d}$[d]	$\underline{d}^2$
5-5	1	1	.00	.00
5-15	2.5	2	.50	.25
6-18	2.5	3	.50	.25
15-5	4	4	.00	.00
15-15	5	5	.00	.00
18-20	6	6	.00	.00
18-6	7	7	.00	.00
18-5	8	8	.00	.00
20-18	9	9	.00	.00
20-18\	10	10	.00	.00
Total				.50

[a].9969

[b]Top 10 cells listed refer to the order of coder's numerical frequency.

[c]Rank observation one and observation two refer to the origin of the coding.

[d]$\underline{d}$ refers to the differences between the ranks of each cell for observation one and observation two.

Name Subject 210 | Grade Secondary

Class Observation One | CAFIAS | Setting Coaching

No. 20 G, B, Coed | Time Afternoon

	2	12	3	13	4	14	5	15	6	16	7	17	8	18	8\	18\	9	19	10	20
2							5	2						1	2	4	1			
12															1	2				
3							1		1					1	1	1				
13																				
4													5		2					
14																				
5					2		91	75	25	3	4	1		8	4	8	2	2		
15					1		69	68	18	2	3			2	3	3	1	1		
6									1					75	2	14				
16														5		1				
7	9	1					6	4	4		5		1	1	1					
17	1	1																		
8							3	2	2				2						3	1
18	1		1		3		29	13	30	3	11		2	6	3	4			3	32
8\	1		1		2		3	1	8		3				1				5	
18\	6	1	2				4		20		3					1			5	19
9			2								1									
19			1								1									
10													1	1	7	7				
20							1	1	1				2	28	1	21				1
Tea	18	3	7	0	8	0	212	166	115	8	33	1	11	128	28	66	4	3	16	53
Env																				
Stu																				
Tot	18	3	7	0	8	0	212	166	115	8	33	1	11	128	28	66	4	3	16	53
%	2.0	.3	.8	0	.9	0	24.1	18.9	13.1	.9	3.7	.1	1.2	14.5	3.2	7.5	.5	.3	1.8	6.0

Name Subject 210
Class Observation Two
No. 20 G, B, Coed

CAFIAS

Grade Secondary
Setting Coaching
Time Afternoon

	2	12	3	13	4	14	5	15	6	16	7	17	8	18	8\	18\	9	19	10	20
2							5	2						1	2	4	1			
12															1	2				
3							1		1					1	1	1				
13																				
4													5		2					
14																				
5					2		91	76	25	3	4	1		8	4	8	2	2		
15							69	68	18	2	3			2	3	3	1	1		
6									1					75	2	14				
16														5		1				
7	9	1					6	4	4		5		1	1	1					
17	1	1																		
8							3	2	2				2						3	1
18	1		1		3		29	13	30	3	11		2	6	3	4			3	32
8\	1		1		2		3	1	8		3				1				5	
18\	6	1	2				4		20		3					1			5	19
9			2								1									
19			1								1									
10													1	1	7	7				
20													2	28	1	21				1
Tea	18	3	7	0	8	0	212	167	115	8	33	1	11	128	28	66	4	3	16	53
Env																				
Stu																				
Tot	18	3	7	0	8	0	212	167	115	8	33	1	11	128	28	66	4	3	16	53
%	2.0	.3	.8	0	.9	0	24.1	18.9	13.1	.9	3.7	.1	1.2	14.5	3.2	7.5	.5	.3	1.8	6.0

CODER RELIABILITY[a] FOR SELECTED SUBJECTS

USING SPEARMAN'S RHO

Subject 102--Effective Coach

Top 10 Cells[b]	Rank Observation One[c]	Rank Observation Two	d[d]	d^2
8\-10	2.5	1	1.50	2.25
18\-10	2.5	2	.50	.25
10-8\	2.5	3.5	1.00	1.00
10-18\	2.5	3.5	1.00	1.00
18-20	5	5	.00	.00
20-18	6	6	.00	.00
15-18	7	7	.00	.00
8\-3	8	8	.00	.00
18\-3	9	9	.00	.00
6-18	10	10	.00	.00
Total				4.50

[a].9727

[b]Top 10 cells listed refer to the order of coder's numerical frequency.

[c]Rank observation one and observation two refer to the origin of the coding.

[d]d refers to the differences between the ranks of each cell for observation one and observation two.

Name Subject 102 | Grade Secondary

Class Observation One | CAFIAS | Setting Coaching

No. 20 G, B, Coed | Time Afternoon

	2	12	3	13	4	14	5	15	6	16	7	17	8	18	8\	18\	9	19	10	20
2	2	1	1	1			2	2/5	1	2				1	10	11				
12	1	1	1	1			1	1/1	1	1					3	4				
3	1	1	1		2		5	2/5	4	1				3	12	12				1
13	1	1			1		2	2	1	2					3	3				
4													2	1	3	1				
14																				
5					1		9	8/5	8	2				3	7	10	1	1		
15					1		7	7/1	4/1					23	3	8	1	1		
6							1							17	3	7				
16														3	4	5				
7	5						1	0/2	1	1										
17							1													
8			2														1	1		
18	3		10	4			10	4/8	3		4			1	2	2	2	2		30
8\	11	5	20	5	1		7	0/1	5	1	2	1			2	2			56	
18\	13	7	19	5	1		10	0/2	5	1	2	1			4	4			56	10
9			1				1				1									
19			1				1				1									
10															56	56				
20									1				1	29	4	11				
Tea	37	16	56	16	7	0	58	26	35	11	12	2	3	81	116	136	5	5	112	41
Env								30												
Stu																				
Tot	37	16	56	16	7	0	58	56	35	11	12	2	3	81	116	136	5	5	112	41
%	4.6	2.0	7.0	2.0	.9	0	7.2	7.0	4.3	1.4	1.5	.2	.4	10.1	14.4	16.9	.6	.6	13.9	5.1

Name Subject 102 | Grade Secondary

Class Observation Two | CAFIAS | Setting Coaching

No. 20 G, B, Coed | Time Afternoon

	2	12	3	13	4	14	5	15	6	16	7	17	8	18	8\	18\	9	19	10	20
2	2	1	1	1			2	2/5	1	2				1	10	11				
12	1	1	1	1			1	1/1	1	1					3	4				
3	1	1	1		2		5	2/5	4	1				3	12	12				1
13	1	1			1		2	2	1	2					3	3				
4													2	1	3	1				
14																				
5					1		9	8/5	8	2				3	7	10	1	1		
15							7	7/1	4/1					23	3	8	1	1		
6							1							17	3	7				
16														3	4	5				
7	5						1	0/2	1	1										
17																				
8			2														1	1		
18	3		10	4			10	4/8	3		4			1	2	2	2	2		30
8\	11	5	20	5	1		7	0/1	5	1	2	1			2	2			58	
18\	13	7	19	5	1		10	0/2	5	1	2	1			4	4			57	10
9			1				1				1									
19			1				1				1									
10															56	56				
20									1				1	29	4	11				
Tea	37	16	56	16	7	0	58	26	35	11	12	2	3	81	116	136	5	5	114	41
Env								30												
Stu																				
Tot	37	16	56	16	7	0	58	56	35	11	12	2	3	81	116	136	5	5	114	41
%	4.6	2.0	7.0	2.0	.9	0	7.2	7.0	4.3	1.4	1.5	.2	.4	10.1	14.3	16.9	.6	.6	14.0	5.1

CODER RELIABILITY[a] FOR SELECTED SUBJECTS

USING SPEARMAN'S RHO

Subject 110--Effective Coach

Top 10 Cells[b]	Rank Observation One[c]	Rank Observation Two	d[d]	d^2
20-18\	1	1	.00	.00
5-18\	2	2	.00	.00
18\-20	3	3	.00	.00
18\-3	4	4	.00	.00
18\-5	6	5	1.00	1.00
18\-10	6	6	.00	.00
10-18\	6	7	1.00	.00
8\-10	8	8	.00	.00
10-8\	9	9	.00	.00
8\-3	10	10	.00	.00
Total				2.00

[a].9878

[b]Top 10 cells listed refer to the order of coder's numerical frequency.

[c]Rank observation one and observation two refer to the origin of the coding.

[d]$\underline{d}$ refers to the differences between the ranks of each cell for observation one and observation two.

Name Subject 110
Class Observation One
No. 12 G, B, Coed

CAFIAS

Grade Secondary
Setting Coaching
Time Afternoon

	2	12	3	13	4	14	5	15	6	16	7	17	8	18	8\	18\	9	19	10	20
2	3	2					7	4	2						7	11				
12	1	1					4	2	1						2	6				2
3	3	2	1	1			14	8	5		2		1	1	11	21	1			1
13	2	2	1	1			4	2	4							1	1			
4													1	1	7	3				
14													1	1	2					
5		2			3	1	14	13	8	2	1	1		4	22	47	3	3		
15		1			2		11	10	3	1				2	6	9	2	2		
6							1							13	2	6				
16														6						
7	7	2																		
17	2	2																		
8					1	1								1						
18			1	1	1	1	8	3	1	1				3	2	2	1	1		11
8\	3		26	8	3	1	16	1	3	1	1				5	8	2	2	37	1
18\	9	5	39	9	3	1	38	3	3	4	3				8	22	1	1	38	42
9	1	1	5	2							1	1								
19	1	1	4	2							1	1								
10															33	38				
20														3	9	52				2
Tea	32	21	77	24	13	5	118	46	30	9	9	3	3	35	116	226	11	9	75	59
Env																				
Stu																				
Tot	32	21	77	24	13	5	118	46	30	9	9	3	3	35	116	226	11	9	75	59
%	3.5	2.5	8.4	2.6	1.4	.5	12.8	5.0	3.3	1.0	1.0	.3	.3	3.8	12.6	24.5	1.2	1.0	8.1	6.4

Name Subject 110 Grade Secondary

Class Observation Two CAFIAS Setting Coaching

No. 12 G, B, Coed Time Afternoon

	2	12	3	13	4	14	5	15	6	16	7	17	8	18	8\	18\	9	19	10	20
2	3	2					7	4	2						7	11				
12	1	1					4	2	1						2	6				2
3	3	2	1				14	8	5		2		1	1	11	21	1			1
13	2	2	1				4	2	4							1	1			
4													1	1	7	3				
14													1	1	2					
5		2			3	1	14	13	8	2	1	1		4	22	48	3	3		
15		1			2		11	10	3	1				2	6	9	2	2		
6							1							13	2	6				
16														6						
7	7	2																		
17	2	2																		
8				1										1						
18			1	1	1	1	8	3	1	1				3	2	2	1	1		11
8\	3		27	8	3	1	16	1	3	1	1				5	8	2	2	37	1
18\	9	5	41	9	3	1	40	3	3	4	3				8	22	1	1	39	43
9	1	1	5	2							1	1								
19	1	1	4	2							1	1								
10															36	38				
20														3	9	52				2
Tea	32	21	80	24	13	5	120	46	30	9	9	3	3	35	119	227	11	9	76	60
Env																				
Stu																				
Tot	32	21	80	24	13	5	120	46	30	9	9	3	3	35	119	227	11	9	76	60
%	3.5	2.5	8.5	2.6	1.4	.5	12.8	5.0	3.3	1.0	1.0	.3	.3	3.8	12.7	24.4	1.2	1.0	8.1	6.4

Appendix C

CLASSIFICATION OF DATA FOR ALL SUBJECTS ON THE EIGHT CAFIAS VARIABLES

1. Teacher use of questioning, verbal (TQV)
2. Teacher use of questioning, nonverbal (TQNV)
3. Teacher use of acceptance and praise, verbal (TAPV)
4. Teacher use of acceptance and praise, nonverbal (TAPNV)
5. Pupil verbal initiation, teacher suggestion (PVITS)
6. Pupil nonverbal initiation, teacher suggestion (PNVITS)
7. Pupil verbal initiation, student suggestion (PVISS)
8. Pupil nonverbal initiation, student suggestion (PNVISS)

MEAN SCORES OF THE EIGHT CAFIAS VARIABLES

Less Effective Coaches

Subjects	TQV[a]	TQNV	TAPV	TAPNV	PVITTS	PNVITTS	PVISS	PNVISS
201	6.33	0.98	41.60	30.72	79.17	35.87	23.49	21.19
202	7.48	.00	42.42	33.76	95.56	64.51	5.50	5.77
203	5.97	2.78	11.68	4.79	50.00	1.32	20.00	20.00
204	4.04	0.91	16.32	4.35	58.40	3.33	7.90	9.38
205	4.62	.00	16.09	16.45	97.06	56.25	3.89	2.13
206	7.03	1.62	31.81	30.00	39.95	18.87	7.92	7.44
207	17.38	17.28	17.43	19.33	27.79	10.93	21.21	28.85
208	18.37	11.11	15.91	46.15	38.83	17.72	10.00	5.71
209	17.05	0.93	58.45	59.65	76.92	14.16	12.50	8.16
210	5.91	.00	13.32	12.50	50.85	18.61	22.92	18.84
211	2.50	3.65	13.98	14.55	52.08	23.44	20.77	25.83
212	9.56	2.26	18.84	41.23	67.37	12.07	7.86	9.17

MEAN SCORES OF THE EIGHT CAFIAS VARIABLES (continued)

Less Effective Coaches

Subjects	TQV	TQNV	TAPV	TAPNV	PVITTS	PNVITTS	PVISS	PNVISS
213	7.58	2.71	24.96	11.91	32.08	5.89	22.15	25.00
214	4.44	.00	16.84	7.34	63.46	25.36	14.46	12.05
215	5.50	.00	17.02	15.76	48.79	11.99	23.56	15.19
Total	124.02	44.23	356.67	348.49	878.31	320.32	224.13	214.71

[a]Total description of the eight CAFIAS variables can be seen on page 76.

MEAN SCORES OF THE EIGHT CAFIAS VARIABLES

Effective Coaches

Subjects	TQV[a]	TQNV	TAPV	TAPNV	PVITTS	PNVITTS	PVISS	PNVISS
101	8.25	4.11	65.83	35.19	96.70	59.44	6.80	5.79
102	9.08	.00	62.77	61.42	93.63	67.56	2.43	2.06
103	4.79	2.29	64.81	79.77	76.89	30.30	4.30	2.73
104	16.12	4.32	66.40	41.00	77.99	36.18	17.67	9.26
105	19.39	3.13	58.29	35.81	70.57	33.00	25.07	12.14
106	7.22	1.79	59.67	23.07	94.15	40.48	7.13	7.09
107	21.79	8.74	59.67	67.37	73.07	28.69	11.80	6.97
108	17.68	5.56	43.69	52.98	52.81	21.95	25.45	29.66
109	20.00	3.09	74.62	65.46	83.23	50.75	16.16	10.17
110	9.59	5.99	69.89	72.81	95.80	86.13	11.28	5.07
111	7.99	1.84	66.29	71.82	86.15	72.12	10.37	3.50
112	8.39	6.44	72.29	87.06	96.03	95.04	3.17	2.25

MEAN SCORES OF THE EIGHT CAFIAS VARIABLES (continued)

Effective Coaches

Subjects	TQV	TQNV	TAPV	TAPNV	PVITTS	PNVITTS	PVISS	PNVISS
113	9.40	.00	23.71	30.21	91.47	42.37	8.45	6.91
114	10.83	0.71	81.77	88.76	96.28	83.30	3.47	2.10
115	2.94	.00	49.76	58.54	96.97	92.04	6.25	1.44
Total	173.46	48.01	919.46	871.27	1281.74	839.35	159.80	107.14

[a]Total description of the eight CAFIAS variables can be seen on page 76.

Appendix D

INSTRUCTION SHEET FOR THE COACHES' PERFORMANCE CRITERIA QUESTIONNAIRE

The Coaches' Performance Criteria Questionnaire is comprised of nine questions related to teaching effectiveness that reflect the content of the nine variables identified by Rosenshine and Furst (1973) that influence student growth. The variables were identified through a careful review of process-product (teaching behavior-student achievement) studies.

Before using the questionnaire, please read each question carefully. After observing the practice, circle the rating scale score that best describes the coach or player behavior considered in each question. The rating scale is as follows:

5	4	3	2	1
Consistently	Usually	Occasionally	Seldom	Never

The nine variables to which the questions are addressed are as follows:

1. Clarity.

   Clarity refers to the clear presentation of information and directions as reflected by the appropriateness of the practice in terms of (a) the skill level of the team and (b) the intellectual level of the team. Concepts are explained clearly and players' questions are answered clearly.

2. Variability or Flexibility.

   Variability or flexibility refers to the use of different procedural and organizational patterns and the coach's use of teaching aids, supplies, and/or equipment.

3. Enthusiasm.

   Enthusiasm is apparent through coach interest, excitement, and involvement during practice as evidenced by tone of voice, facial expression, physical involvement, and creativity.

4. Task-oriented and/or Business-like Behavior

Task-oriented and/or business-like behavior involves achievement-oriented practices with the coach exhibiting conduct leading to the fulfillment of the practice objectives.

5. Student Opportunity to Learn Criterion Materials

Player opportunity to learn is influenced by the amount of time allotted for learning or practicing the skill or material presented in the practice.

6. Teacher Indirectness

Accepting, encouraging, and indirectness encompasses the provision for player input of ideas with appropriate acknowledgment, acceptance, and application of those ideas.

7. Use of Criticism

Use of criticism refers to the appropriateness of the method of controlling the practice. Except for criticism which was appropriately used for control, the coach avoided the use of harsh criticism.

8. Use of Structuring Comments

Use of structuring comments by the coach refers to clarification of material by reviewing what is to happen or reviewing previously presented material.

9. Multiple Levels of Questions or Cognitive Discourse

Multiple levels of questions or cognitive discourse is the coach's use of various types of questions concerning information and content presented.

Appendix E

COACHES' PERFORMANCE CRITERIA QUESTIONNAIRE

1. Did the coach present the material and give directions so as to avoid confusion on the part of the players?

5	4	3	2	1
Consistently	Usually	Occasionally	Seldom	Never

2. Did the coach vary teaching methods and organizational procedures?

5	4	3	2	1
Consistently	Usually	Occasionally	Seldom	Never

3. Was the coach's behavior characterized by consistent enthusiasm and interest in the practice?

5	4	3	2	1
Consistently	Usually	Occasionally	Seldom	Never

4. Did the coach structure the activities and direct his/her behavior toward the achievement of task oriented objectives?

5	4	3	2	1
Consistently	Usually	Occasionally	Seldom	Never

5. Was the players' time scheduled efficiently to allow a maximum chance to learn and practice the skills or materials presented?

5	4	3	2	1
Consistently	Usually	Occasionally	Seldom	Never

6. Did the coach provide an opportunity for the input of players' ideas or actions and appropriately acknowledge, accept, praise, encourage, or apply those ideas or actions during practice?

5	4	3	2	1
Consistently	Usually	Occasionally	Seldom	Never

7. Did the coach avoid the use of harsh criticism in maintaining practice control and evaluating player performance?

5	4	3	2	1
Consistently	Usually	Occasionally	Seldom	Never

8. Did the coach clarify and put into perspective a progression of information, skills, or strategies which he/she presented?

5	4	3	2	1
Consistently	Usually	Occasionally	Seldom	Never

9. Did the coach use a variety of questions to initiate players' responses which demonstrated an understanding of information, skills, or strategies presented?

5	4	3	2	1
Consistently	Usually	Occasionally	Seldom	Never

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